

# How to Adapt Your DX Contest Strategies for Low Solar Activity

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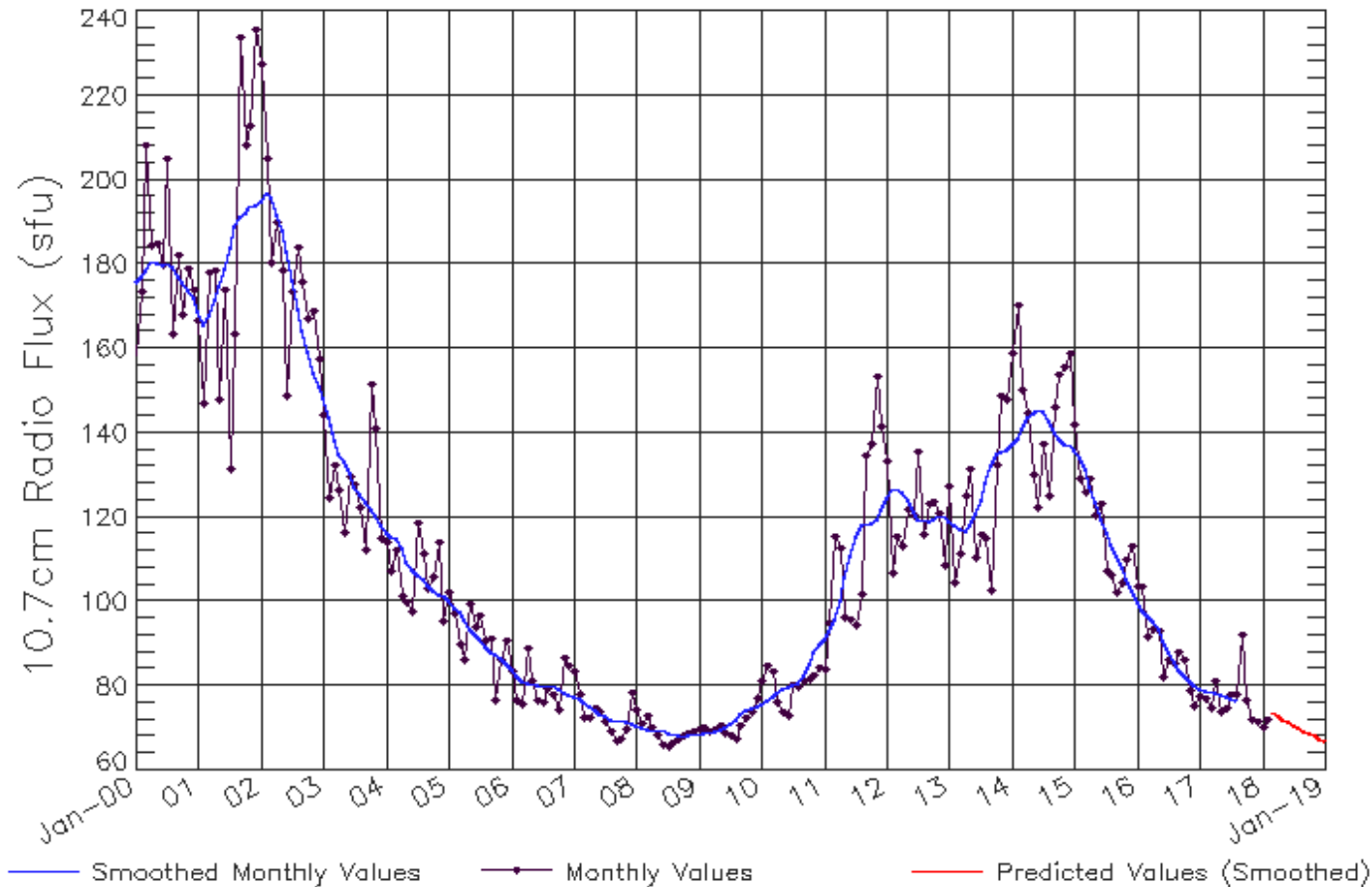
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# Very Low Solar Activity through 2021

solar activity should start to slowly increase during 2020



ISES Solar Cycle F10.7cm Radio Flux Progression  
Observed data through Feb 2018



Updated 2018 Mar 5

NOAA/SWPC Boulder, CO USA

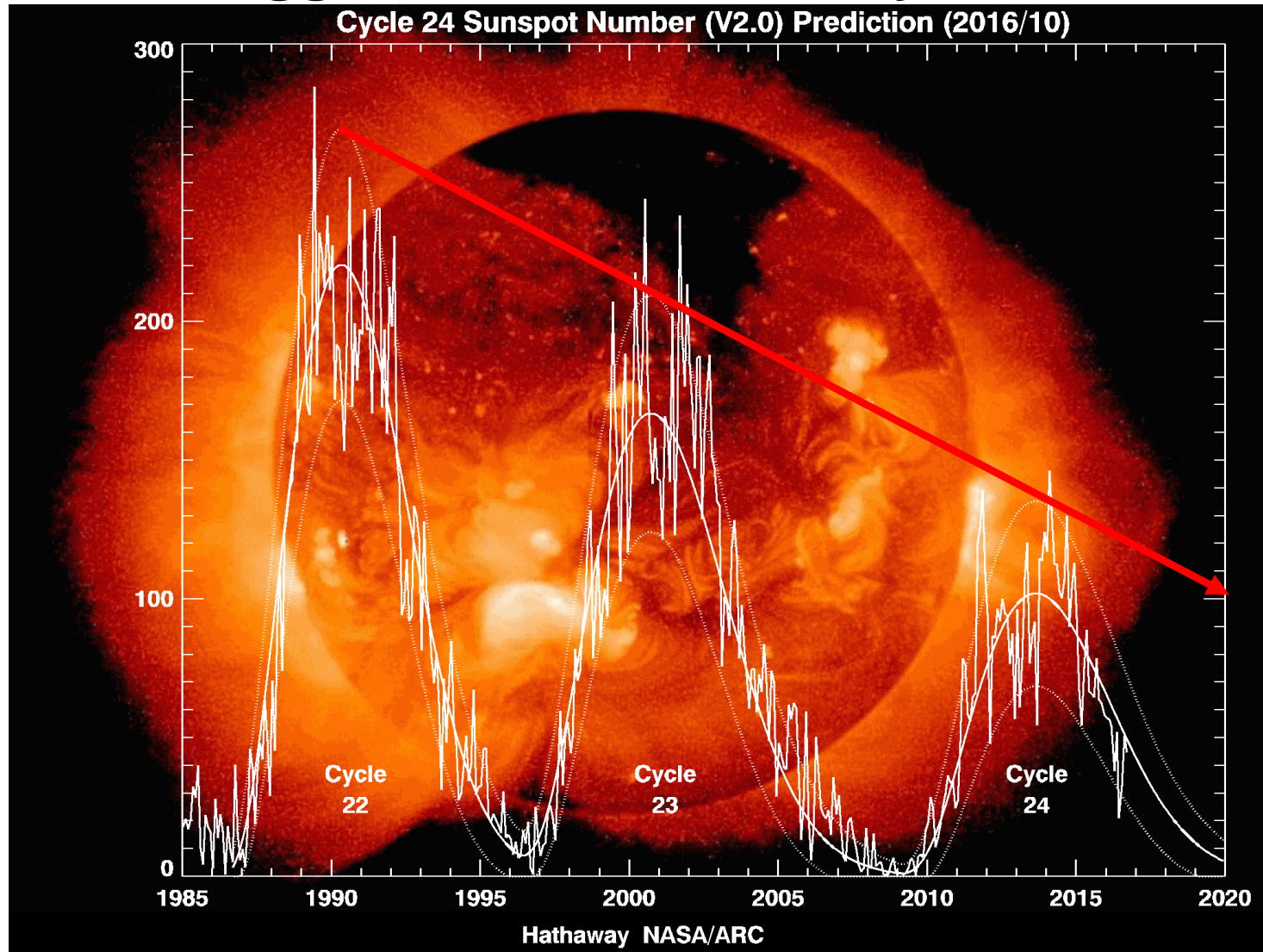
# What About Solar Cycle 25 ??



**Cycle 25 is likely to be somewhat stronger than Cycle 24**

- **Solar polar magnetic field strength is now slightly stronger than at the same period prior to the last Solar Cycle minimum**
  - early indicator that Cycle 25 is likely to be **somewhat stronger** than Cycle 24
  - the magnetic field strength of the Sun's north pole continues to increase
- **Spotless days are now much more frequent** than before October 2017
  - weak cycles are preceded by at least 600 spotless days over five years
  - there were 817 spotless days during the five years prior to Solar Cycle 24
  - there were 94 spotless days in 2017, **there will be many more before 2021**
- **Geomagnetically quiet days** will be more frequent after solar minimum
  - **fewer solar flares and coronal mass ejections** have occurred since 2016
  - less frequent, less intense **coronal holes** will occur after solar minimum
- Cycle 25 sunspots will be more frequent as solar minimum approaches
  - but solar flux will continue at low levels -- 70s or less -- through 2021

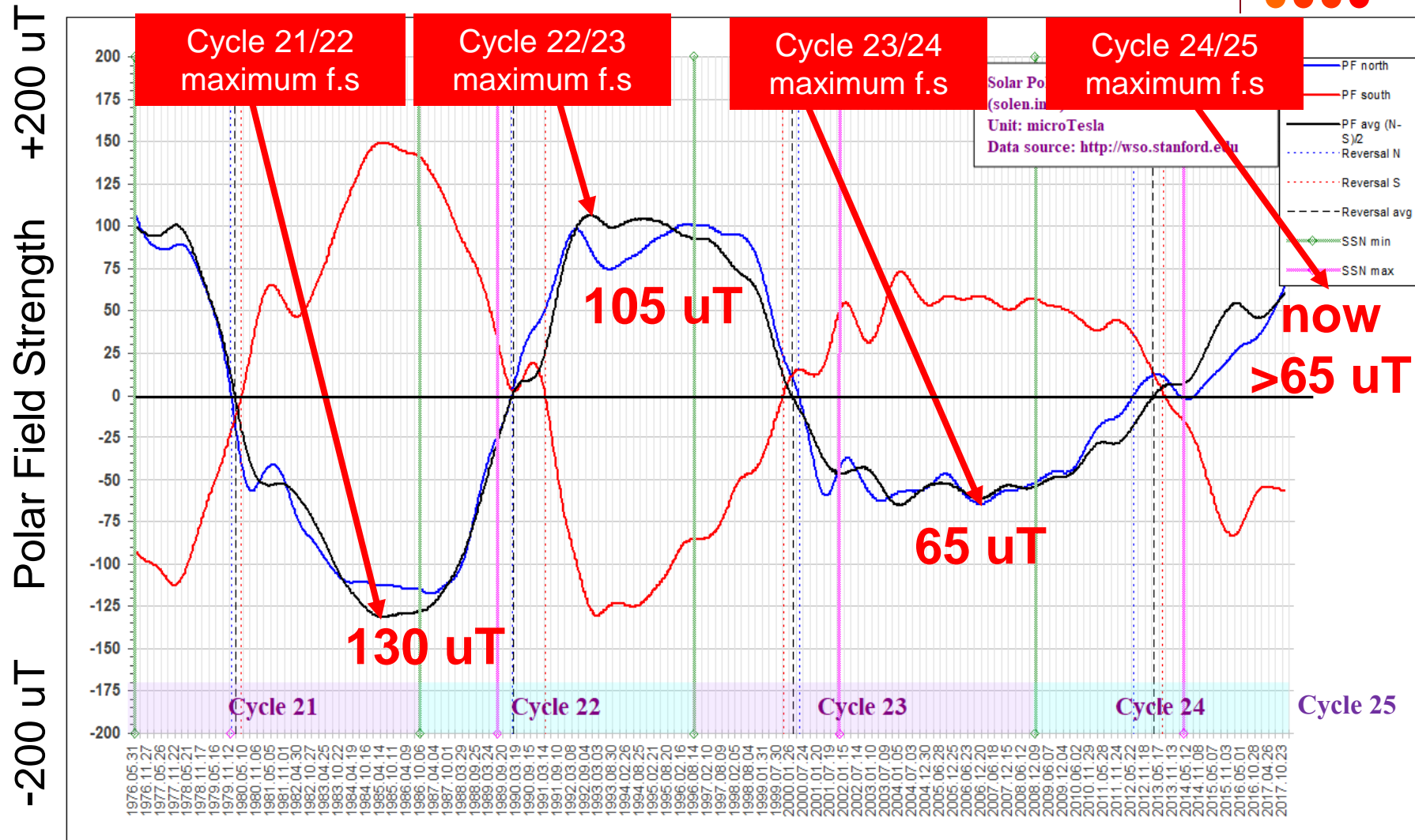
# Steadily Declining Solar Activity Since 1990 suggests a weak Solar Cycle 25



Cycle 25?

# Solar Polar Field Strength Precursor Method

f.s. >65 uT suggests a somewhat stronger Solar Cycle 25



# 160 Meter Propagation

## during very low solar activity through 2021



- Significantly improved DX propagation
  - stronger signals
  - longer and more reliable openings especially to Europe and Japan
  - consistently low absorption caused by less frequent, weaker coronal holes
    - especially after solar minimum from 2020 through 2022
      - coronal holes provide the poleward magnetic flux transport mechanism leading to solar minimum
  - less daytime D layer absorption before sunset and just after sunrise
  - less frequent and less intense night time E layer absorption
- More crowded conditions during major contests
  - especially when there is no strong 80 meter propagation to Europe
- More regular, longer and stronger worldwide DX openings
  - continuous openings to Europe, Mid-east and north Africa 2200-0830Z
  - frequent strong JA openings at sunrise mid-Nov to late Feb 1200-1230Z
  - short path polar opening to central Asia will be more frequent 2200-0200Z



# 80 Meter Propagation

## during very low solar activity through 2021



- Significantly improved DX propagation
  - stronger signals
  - more reliable openings especially to Europe and Japan
  - consistently low absorption caused by less frequent, weaker coronal holes
    - especially after solar minimum from 2020 through 2022
    - coronal holes provide the poleward magnetic flux transport mechanism leading to solar minimum
  - less daytime D layer absorption before sunset and just after sunrise
- More crowded conditions during major DX contests
  - especially when there is no strong 40 meter propagation to Europe
- More regular, longer and stronger worldwide DX openings
  - continuous openings to Europe, Mid-East & north Africa 2130-0830Z
  - regular JA opening starting before sunrise Nov to late Feb ~1130-1300Z
  - short path polar opening to central Asia will be more frequent 2200-0200Z

# 40 Meter Propagation

## during very low solar activity through 2021



- Nearly 24 hour DX openings during November CQWW CW
- Europe, Mid-East and north Africa propagation
  - activity QSYs to 40 meters **before mid-afternoon** ~1930Z
  - **don't miss the strong mid-afternoon/evening openings 2000-0200Z**
  - ***propagation often fades/fails a few hours after sunset*** 0200-0600Z
  - ***strong openings*** usually resume at sunrise in Europe 0600-0930Z
- Japan, Far East and Central Asia propagation
  - brief direct short path opening at JA sunset 0800-0900Z
  - weak skew path opening at about 240° azimuth ~0900-1130Z
  - strongest short path JA opening from the east coast ~1130-1300Z
  - strong long path Asia signals at 150° azimuth 2130-2215Z
- VK/ZL and Asia long path 90° to 150° 2100-2300Z
- Southeast and central Asia long path about 240° ~1130-1300Z



# 20 Meter Propagation

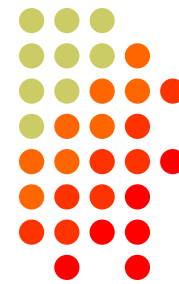
## during very low solar activity through 2021



- Usually closes well before midnight ~0300Z
  - sporadic, weak night time Africa & south Pacific openings 0500-0700Z
  - often -- *but not always* -- stays closed for most of the night
- Europe, Mid-East and north Africa propagation
  - from before our sunrise until mid-afternoon ~1000-1900Z
    - the opening is *sometimes* delayed until after our sunrise
    - the opening fades earlier in the afternoon than in recent years
- Japan, Far East and central Asia propagation
  - short evening short path opening 2130-0100Z
  - morning short path opening 1300-1500Z
  - both openings are much shorter than in recent years
- South Asia and Mid-East morning long path  $\sim 240^\circ$  1300-1500Z
- VK, ZL and south Pacific mid-afternoon long path 1900-2200Z

# 15 Meter Propagation

## during very low solar activity through 2021



- Europe, Mid-East and north Africa propagation
  - **usually** from an hour after sunrise until early afternoon 1230-1800Z
  - much shorter and weaker openings than we've enjoyed until this year
- Japan and Far East propagation
  - weak, unreliable late afternoon short path opening 2130-2300Z
    - sometimes only via the weak signal skew path at about 240°
    - much shorter openings than we've enjoyed in recent years
  - rare morning weak signal long path opening at 150° ~1300-1400Z
- The band usually closes a few hours after our sunset ~0100Z
  - always stays closed all night

# 10 Meter Propagation

## during very low solar activity through 2021



- South America, Caribbean and Central America
  - PY and LU activity has increased significantly in recent years
  - **usually** opens a few hours after our sunrise ~1400Z
  - opening often fades for an hour or two, **then returns much stronger**
  - usually closes at about sunset or earlier ~2200Z
    - always stays closed all night
- Southern Europe and north Africa
  - very weak scatter path signals at 110 to 150° azimuth ~1400-1700Z
- VK/ZL/KH6 and south Pacific
  - **usually** a reliable weak signal opening ~1900-2100Z
- Japan, North Pacific and Far East
  - rare morning weak signal long path opening at 150° ~1300-1400Z
  - rare evening very weak signal skew path 200 to 240° 2130-2200Z

# DX Contest Strategies

during very low solar activity through 2021



- High antennas are much more important during solar minimum
- Improve your low band transmitting *and receiving* antennas!
- **Start every DX contest on 40 meters**
  - the strong European opening *often ends a few hours after our sunset*
- Capitalize on improved 160 and 80M propagation 2200-0830Z
  - especially important when 40 meters is not strongly open to Europe
- Strong 40 meter opening *after sunrise in Europe* 0600-**0930**Z
- 160, 80 and 40 meter openings to VK, ZL and JA 0900-1230Z
- 20M European opening usually starts before sunrise **1000**-1900Z
- 15M European opening usually starts after sunrise 1230-1800Z
- 10 meters openings almost exclusively to the south 1400-2100Z
- Strong 40M afternoon/evening openings to Europe **2000**-0300Z
- 20 meter evening openings to Japan 2130-0100Z